The Daedalean

Semper Discens

Monthly Aerospace Education Newsletter of the Connecticut Wing of the Civil Air Patrol

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FOR FUTURE PLANNING

13-15 MAY-CTWG Great Starts
21 MAY-Aero Open House/Young Eagles-HFD
21-22 MAY-Corporate Learning Course
21-25 JUN-National AEO School
15 JUL-KC-10 Field Trip-McGuire AFB
9-16 JUL-RSC-McGuire AFB
9-16 JUL-Reg. Cadet Ldrshp School-Concord, NH
23 JUL-07 AUG-NESA (two sessions)
08-14 AUG-CTWG Encampment
13-20 AUG-Reg. Cadet Ldrshp School-McGuire
17-20 AUG-CAP Nat'l Summer Conference
22-24 SEP-AOPA Summit-Hartford
22-23 OCT-CTWG Convention

COMMUNICATIONS WITH THE DAE

Squadron Commanders and Aerospace Eduction Officers are requested to send the following information to rocketto@aquilasys.com:

1. ***The name of the current AEO.***
2. ***Any new Yeager Awards.***
3. ***Any changes in AEO Specialty Tracks***
4. ***Any information about current squadron activities in aerospace such as special events or field trips.***
5. ***Cadet rocketry badge awards.***

JOINT HFD AEROTECH AND EAA HFD/SKYLARK EVENTS

Lt Col Ken Benson from the Royal Charter Squadron invites CT CAP personnel to attend the Connecticut Aero Tech Open House and Hartford and Skylark Experimental Aircraft Association Young Eagles event at Brainard Field on Saturday, 21 May between 0900 and 1100.

Cadets interested in pursuing a career as an airframe and power plant mechanic will be offered an opportunity to become familiar with the school and ask questions about this federally licensed trade.

CT Aero Tech is part of the Connecticut Technical School System and offers a 2400 hour aviation maintenance curriculum designed to develop those skills needed to meet FAA requirements. Enrollment takes place every four months. The cost for tuition and tools will run around $10,000 and scholarships are available. For more information, go to: http://www.cttech.org

At the same time, the EAA will be flying youth for free as part of their Young Eagles program. Volunteer pilots will offer no-cost orientation flights to youths in the age group of eight-18 age group. Lt Col Benson mentions that the event might even be open to "old Eagles." CAP Cadets are welcome but this is not a CAP sponsored activity.

Finally, are any squadrons interested in participating in a CAP information booth and recruiting station? Is so, contact Col Benson at

starshinefarms@msn.com

with a courtesy copy to the CTWG Director of Aerospace Education at

srocketto@aquilasys.com

CAP AEROSPACE EDUCATION MONTHLY NEWSLETTER

The spring edition of the CAP Aerospace Education Newsletter and an archive of past editions is available on the CAP A/S Education

main page at:

http://members.gocivilairpatrol.com/aerospace_education.

Each issue contains information on aerospace current events, CAP Aerospace Educators, curriculum ideas, and CAP aerospace activities.

CTWG KC-10 FIELD TRIP

The Wing is planning a two day field trip to McGuire AFB, NJ on 14-15 July, a Thursday and Friday. Lt Kevin McCusker of the 103rd at Bradley is the project officer.

McGuire Based Extender on the Flight Line

Plans are tentative but the plans are to leave from Bradley at 0900 and check in at McGuire at 1500. Meals will be taken at the McGuire dining facilities.

At 0900 on Friday, we travel to the flight line for an orientation flight on a McDonnell-Douglas KC-10 Extender aerial re-fueler. Anticipated departure time from McGuire is 1400 with a return to Bradley in the early evening.

Anticipated cost will be in the $50 range.

The trip will be limited to 40 Cadets and Officers.

More details will be forthcoming.

Business End of the Refueling Boom

ROAD TRIP! NATIONAL AEROSPACE EDUCATION SCHOOL-NAVAL AIR STATION, PENSACOLA

The CTWG DAE will be attending the school on 21-25 June and is considering driving down and visiting air museums and other historical sites along the way. Tentative plans are for four days at the school and six days on the road. Are any other CAP senior members interested? If so contact:

srocketto@aquilasys.com

CTWG GLIDER PROGRAM

The CAP Glider Program has undergone some changes. At the present time, Lt 2nd Lt Johnny Burke is the coordinator for CTWG.

Last year, a van full of Cadets from Thames River journeyed up to Springfield, VT for a fun-filled weekend of glider flying and aerospace education. It is a worthwhile activity for engagement by any of our squadrons.

More information will be forthcoming as *The Daedalean* is informed about future plans.

TWO FREE OFFERS IN A/S EDUCATION

The first offer comes from the Academy of Model Aeronautics. AMA is a non-profit organization whose purpose is to promote development of model aviation.

Cadets who accept their free membership will be able to participate with local chapters, receive discounts on products, and have an opportunity to compete for scholarships. For further information, go to:

http://www.capmembers.com/media/cms/AMA_MOU_2010_Acad_Model_Aeronautics_AC597A11ES5440.pdf

The second offer comes from the American Institute of Aeronautics and Astronautics, the leading professional group for aeronautical engineering and allied disciplines. The AIAA offers free Educator Associate membership which will allow you to participate in local AIAA section activities. Monthly meetings, technical sessions, and site tours, attend AIAA conferences FREE (if you register in advance), qualify for up to a $200 grant to push your science, math, or related academic agenda forward, and tap into the AIAA clearinghouse of aerospace information.

The program is set up for classroom teachers but CAP AEOs are eligible. The CTWG DAE sits on the council of the Hartford Chapter and is prepared to assist if you encounter difficulty enrolling. For information go to:

http://www.aiaa.org

and follow the links to the Aerospace Associate section. If you encounter difficulty, contact:

srocketto@aquilasys.com

CSRRA AR-15 Training Event

The Connecticut State Rifle and Revolver Association held its annual AR-15 training clinic at the Bell City Rifle Club in Southington last month. The AR-15 is the civilian version of the M-16 rifle. Although the clinic was not a CAP sponsored event, four CTWG members attended the safety training and 200 yard firing practice. Participating were Cadets Daniels and Ray from Thames River and Cadet James Planeta from Manchester. Planeta is a member of the Connecticut State Junior High Power Team and assisted in coaching and scoring.

Cadet Daniels in the Prone Position

Cadet Planeta's brother George, formerly of the Meriden Squadron, is now a second year Midshipman at the US Naval Academy, Annapolis, Md. After training with the Quaker Hill Rod and Gun Club while in high school, he was accepted at Annapolis and set the new

Midshipman M-16 qualification record and made the Academy Rifle Team as a walk-on.

Maj Rocketto from Thames River attended the session as a coach.

CTWG Riflemen at the National Championships in 2007. Cadet Roe, on the left is now with the CT National Guard. Coach Rocketto is center. Cadet Planeta on the right, is at Annapolis.

CTWG RIFLE SAFETY AND MARKSMANSHIP PROGRAM

The program will resume in the near future. A Wing Rifle Tournament is planned for the fall. Any Squadrons who wish to participate in practice sessions and qualifications for the NRA medals which may be worn on the CAP uniform should contact Maj Rocketto at:

srocketto@aquilasys.com

AEROSPACE CURRENT EVENTS

Endeavor Scheduled for Monday Launch

The last flight of the *Endeavour* orbiter is set for launch on Monday, may 3rd. The *Endeavour* will carry the Alpha Magnetic Spectrometer to the International Space Station (ISS). The instrument is expected to add to the data which might be analyzed to determine details about the physical properties of the universe but has been criticized This will be the 36th shuttle mission to the ISS and a 14 day stay is planned.

New Light Plane Record

Douglas Cairns, a former Royal Air Force pilot who had to leave the service when he was diagnosed with diabetes, sent a new speed record for a flight from Point Barrow, Alaska to the North Pole and return. Flying a Beechcraft Baron solo, Cairns flew to the pole, circled it, and then landed at a Russian ice camp, completing the 1,3000 mile flight in eight hours and 20 minutes. Cairns then flew back to Point Barrow in six hours and 20 minutes with the aid of strong tailwinds.

Beech Baron

AEROSPACE HISTORY

The following article is a continuation of our series on notable air missions.

Breaching the Dams

Operation Chastise
16-17 May, 1943

The bombing mission takes many forms. Strategic bombardment receives the most attention but close air support and interdiction are other important roles. Close air support (CAS) has been pioneered and perfected by the US Marine Corps. CAS, a tactical mission, provides support for troops in close contact with the enemy and it closely coordinated by specialists on the ground, forward air controllers, who understand the capabilities of the aircraft and ordnance and can direct them precisely to avoid fratricide. Interdiction refers to tactical missions in in which enemy ground targets which are not in close proximity to friendly troops

are attacked. These targets might be bridges, supply convoys, or rail lines used to transport supplies to the front lines.

On the other hand, strategic bombardment advocates a form of economic warfare, attacking the industrial infrastructure of a nation in order to destroy its capacity to wage war. First proposed just after World War I ended, by Guilio Douhet, an Italian general, it was practiced in two forms by the Allies in World War II. In its mature form, the British Bomber Command's Main Force preferred to attack German cities at night, in a bomber stream, guided by well trained Pathfinder crews who illuminated the targets with specially designed pyrotechnic markers. The United States effort, epitomized by the Eighth Air Force in Europe, preferred daylight attacks, utilizing massed close formations of aircraft, using the Norden bombsight to increase the precision of the strike. Both methods have obvious advantages and disadvantages but that discussion will be reserved for a later date. This article will be concerned with a British precision night attack designed to cripple the war production of the Ruhr Valley by destroying its sources of industrial water and electrical energy.

As early as 1937, anticipating he coming war, the British Air Staff identified some 45 power plants and coking plants as possible targets but realized that that many targets would require enormous resources and time so they looked for alternatives. Ultimately, the decided that three dams, the Möhne, Sorpe, and Eder, were crucial and their destruction would not only seriously reduce hydro-electric production, produce widespread flooding, and disable large portions of the roads and canals necessary to transport goods. There was one problem. The British possessed no weapon which could destroy these dams.

The lack of a sufficient weapon promoted a wide range of studies on torpedoes, explosives, drones, and attack vehicles which might be able be used to attack the dams. Enter Barnes Wallis. Wallis was the Assistant Chief Designer (Structures) for Vickers-Armstrong with a history of aviation achievements. He designed the highly successful R-100 dirigible. (ed. note: The Chief Calculator on the project was Neville Shute Norway, better known as Neville Shute, author of a long list of novels including *On the Beach*.) Wallis also adopted the geodesic structural pattern which he used on the R-100 to design the Vickers Wellington, a standby in the a early days of World War II and the only British bomber to be produced for the entire course of the war.

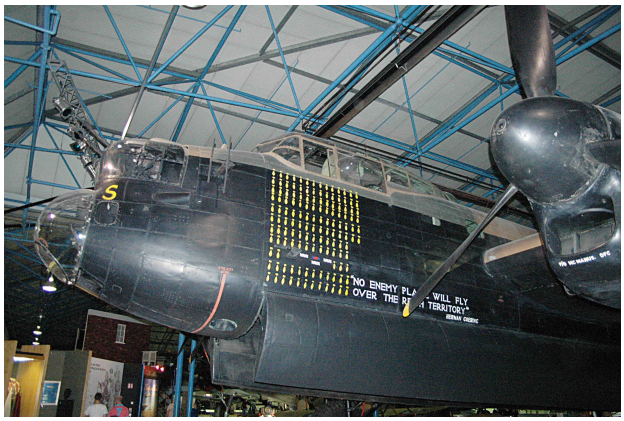
Wallis has studied the problems of the use of bombs for economic warfare for several years and concluded that the bigger the bomb, the better. At that time, the standard British bombs were 500 and 1000 pounders, half of whose weight was casing rather than explosive. Wallis determined that attacks on large structures would be most effective if a very large charge was detonated deep in the earth or water. Shock waves would create the effect of an earthquake. If the bomb was under water, very close, even in contact with the target, the effect can be devastating since the explosive force is tamped by the water and directed into the structure. Two versions of a suitable weapon were finally designed, tested, and used: Highball and Upkeep and they were delivered by a method similar to “skip bombing.”

The weapons were essentially rotating depth charges. Highball, the smaller of the two was designed to be carried by the de Havilland Mosquito for use against capital ships. Upkeep weighed in at just over 9,000 pounds of which 6,600 pounds were Torpex, a new explosive 50% more powerful than TNT. The only aircraft which could carry this payload was the Avro Lancaster.

The four engined Lancaster, arguably the best strategic bomber of World War II until the introduction of the Boeing B-29, was the offspring of the Avro Manchester. The Manchester was powered by two of the lamentably unreliable Rolls-Royce Vulture engines. Twenty five percent of all Manchester's built were lost due to

engine failure. Roy Chadwick, Avro's Chief Designer, recognizing the virtues of the airframe and the inadequacies of its power plants modified the design by installing a redesigned center section to support larger wings and four Rolls-Royce Merlin engines.

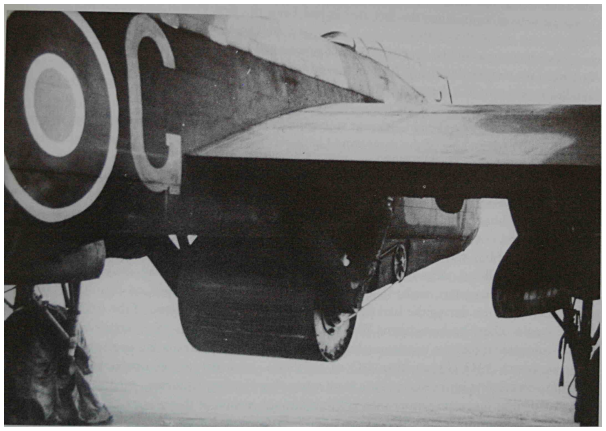
Lancaster B Mk I, POS. with a 4,000 lb Blockbuster a RAF Museum, Hendon



Sugar's Nose Bearing Over 100 Mission Marks and Herr Goering's Famous Boast. Call him Meyer!

Comparing the major allied strategic bombers of World War II is difficult since range varied with bomb load and bomb load varied with mission. Leaving out the B-29 Super Fortress, which entered combat relatively late in the war, for a typical strategic bombing mission, the Boeing B-17G Flying Fortress, Consolidated B-24J Liberator, and the Lancaster Mk III had comparable ranges of about 2,000 miles with the Lancaster carrying a bomb load of 10,000 lb compared to the 17's 5,000 lb and the 24's 8,000 lb. The US bombers carried crews of ten men compared to seven for the British aircraft. This was due to the heavier defensive armament carried by the Flying Fortress and Liberator which were needed due to their utilization in daylight hours. What was uniquely different about the Lancaster was its huge bomb bay, an unobstructed 30 feet long. This was much larger those of the B-17 and B-24 and comparable with the B-29 but the Super Fortress's bay was divided into two compartments.

And it was this enormous bomb bay and its lifting capacity that allowed the Lancaster to carry the Upkeep bomb. The bomb was so large that the bay doors had to be permanently removed. The final version of the bomb was cylindrical is shape and fitted into the bay with only three inches to spare. It was attached to two Vickers designed caliper arms which would swing aside to release the bomb and which allowed the attachment of a belt driven drive mechanism which rotated the cylinder.



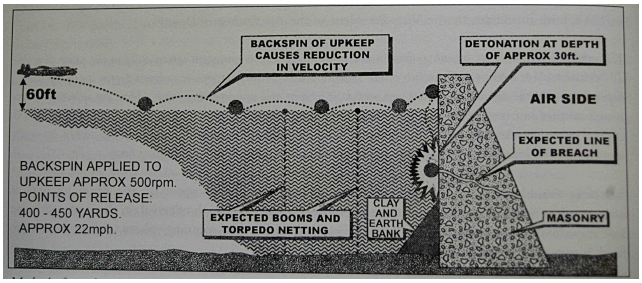
The bomb mounted on Gibson's aircraft. Note the drive mechanism on the starboard side.

(RAFM Crown Copyright)

The time frame for the envisioning the mission, developing and testing the equipment, planning the strike, and training the crews was skewed. Almost three years passed from the time the mission was considered as a possibility until Wallis started researching targets and ordnance and testing methods in order to design an appropriate weapon. Scale models of dams were constructed and destroyed with scaled explosive charges and a

disused dam in Wales was destroyed in a test of a planted charge. This took around two years more.

During that time, the geometry of the bomb evolved from a sphere to its final cylindrical shape. Tests showed that if the bomb was dropped at the correct airspeed from the correct height with a 500 rpm backspin provided by the aforementioned belt driven mechanism, then the bomb would skip across the surface of the reservoir, strike the wall, roll down the wall to a depth of 30 feet, and could be detonated by a hydrostatic fuse.

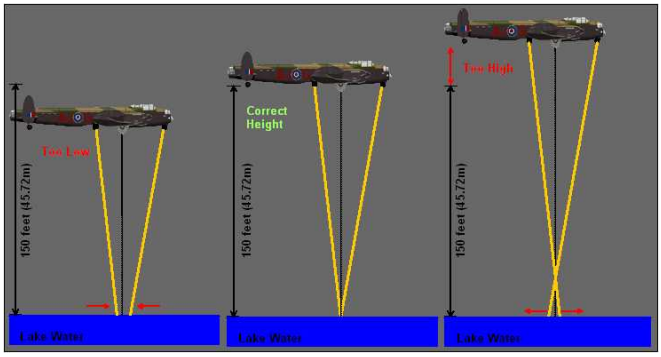


Preliminary Sketch of the "Bouncing Bomb" Attack Technique as Envisioned by Wallis
(Published in the Lincolnshire Echo)

The actual construction of the full-scale bombs and crew training was squeezed into about two months. The final date for a successful attack had to be in the third week of May when the reservoirs were filled to maximum and a full moon would aid the navigators and bomb aimers. In the end, six years on and off preparation were need to fly the four to six hour hour mission.

Seven weeks were allowed for the formation and training of what would become Squadron 617. Air Chief Marshall Sir Harris personally chose Wing Commander Guy P. Gibson to lead the new squadron. Gibson was both a bomber and fighter pilot with over 150 combat sorties to his credit. He had already won two Distinguished Flying Crosses and a Distinguished Service Order. Gibson formed his crews and started a rigorous training schedule of low level flying and the dropping of practice bombs. Two problems needed to be solved. How can one maintain the correct height over water on the final approach and how can one know the correct distance from the target for the bomb release. Two simple solutions were developed.

Altitude was measured by installing a pair of lights in the lower half of the aircraft fuselage. After some experimentation, the forward light was positioned on the left of center and just forward of the leading edge of the wing. The aft light was 20 feet further back, centered in the fuselage and angled forward. Both lights were angled towards the right so that the navigator could observe them from a port on the right side of the aircraft. When the converging beams formed a "figure eight" pattern, the height of the aircraft was correct for the weapons release: 60 feet above the surface.



The Use of Converging Light Beams as an Altimeter
(astrocollection)

Distance was measured by a simple device designed by Wing Commander C.L. Dann. It was a simple wood fixture in the shape of the letter "Y." A piece of wood with a peephole was fixed at the apex of the "Y" and protruding from the arms of the "Y" were two nails. The size of the "bomb sight" was such that when the two towers coincided with the nails, the distance was 476 yards, calculated as correct for a speed of 210 mph. In fact, several crews found this device

awkward to use in turbulence so they devised substitute bomb sights using string and grease pencil markings on the perspex nose of the aircraft.

The Dann Rangefinder
(astrocollection)

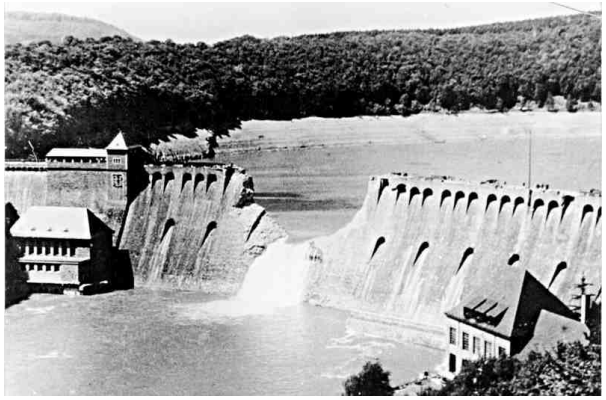
Technicians were frantically working to complete the myriad of other tasks: removing the bomb bay doors and the mid upper turret, installing the calipers and motor to hold and active the spin, acquiring and installing VHF radios, and constructing bomb casings and loading the torpex into the casings. The schedule was so tight that only one actual bomb was tested and that was three days before the actual mission! The last aircraft was delivered on the day of the raid!

On 17 May, 1943, as darkness fell on Scampton, an RAF base in Lincolnshire, 19 Lancasters carrying 133 crewmen departed in three waves. The first wave, consisted of Gibson commanding nine aircraft in groups of three headed for the Möhne Dam as the first objective and the Eder as the second. A second wave of five aircraft were bound to the Sorpe. Five aircraft in the third wave was designated as reserve, to attack the primary and secondary targets if necessary but with three other dams as tertiary targets; the Schwelm, Ennepe and Diemel. The attack force flew at 100 feet above ground level and followed different routes. The run-in fared poorly. Two aircraft were shot down, two aborted due to malfunctions, and one ran into high tension lines and crashed.

Gibson with eight aircraft reached the Möhne Dam and commenced the attack. Gibson, who had fruitlessly bombed first, then flew dry runs with each successive attacker in order to draw off the flak. It took five bombs and one lost aircraft to breach the dam.

Robert Taylor painting of AJ-N captained by Pilot Officer L.G.Knight, successfully breaching the Möhne.

The three remaining aircraft still armed with bombs then headed for the Eder and managed to destroy it with their last weapon. Both dams were severely damaged and the valleys downstream were flooded, destroying property and killing some thousands of people, half of whom were allied prisoners of war or forced laborers.



The Eder, the day after.
(Bundesarchyiv Photo)

Three aircraft from Wave Two reached the Sorpe Dam. The Sorpe was an earth dam, quite different from the Möhne and Eder which were concrete gravity dams. Wallis had calculated that it was

least likely to be destroyed. The bomb run was different, made parallel to and over the dam and the final result was a 60 foot break in the top which somewhat reduced the capacity of the reservoir but was easily repaired.

When notified of the successes at the Möhne and Eder, the reserve force headed for the Sorpe and the last three dams. One bombed the Sorpe with no results, one failed to drop due to fog, one may have actually bombed a dam not on the target list due to navigational difficulties and two aircraft were shot down.

The return flight was fraught with dangers. At least one more aircraft one shot down and another may have hit high tension lines and crashed. One of the bombers struck the sea, scooped up a prodigious amount of water through the open bomb bay, staggered upwards as the water drained but made it back. Three of the shot down crew were captured but 617 Squadron wrote off eight aircraft and Gibson wrote 53 letters of condolence to the next of kin of his dead squadron mates.

In the long run, an analysis of the effects of the raid showed that the damages were less than the original assessments indicated. The German electrical grid was more flexible than thought and energy was rerouted from other sources. The damage and death toll were considerable, waar production was slowed for a time, but the morale effect was very positive for the British, coming at the same time that the Axis forces were defeated in Africa.

Interestingly, international law now forbids attacks against dams, dikes, and water supplies.

Guy Gibson was awarded the Victoria Cross and went on to further distinguish himself until he was killed while flying a Mosquito while acting as Master Bomber for a Main Force raid. The plane ran out of gas due to a fault in the fuel line selector. At his death, Gibson was 26 years old.

Barnes Wallis went on to build bigger and bigger bombs. His Tallboy and Grand Slam earthquake bombs weighed in at 12,00 lb and and 22,000 lb respectively. These were used to destroy railroad tunnels aqueducts, and other hardened targets. Of note is the 617 Squadron attack which used Tallboys to sink the battleship *Tirpitz*.

Roy Chadwick continued designing large military and civilian aircraft for Avro. He was killed in a crash of the prototype of the Tudor airliner. Maintenance had hooked up the ailerons in reverse.

In the 1950s, Paul Brickhill wrote a popular book about the raid which was made into a motion picture. The main criticism of the film was that it was somewhat melodramatic and portrayed Wallis as a determined but somewhat unforceful character. The book and movie suffered from some inaccuracy since many of the details of *Chastise* were classified until 1962.

Finally, the American connections. The nationalities of 617 Squadron were British, Australian, Canadian, and New Zealand but one of the Canadians, Joe McCarthy, was from New York. He joined the Royal Canadian Air Force eight months before Pearl Harbor. In addition, the Avro Lancaster B Mk III known as the Type 464 Provisioning Aircraft which were used in the raids were equipped with the now legendary Rolls-Royce Merlin engines but they were built by Packard in the United States.

617 Squadron Crest
"After me, the deluge"